

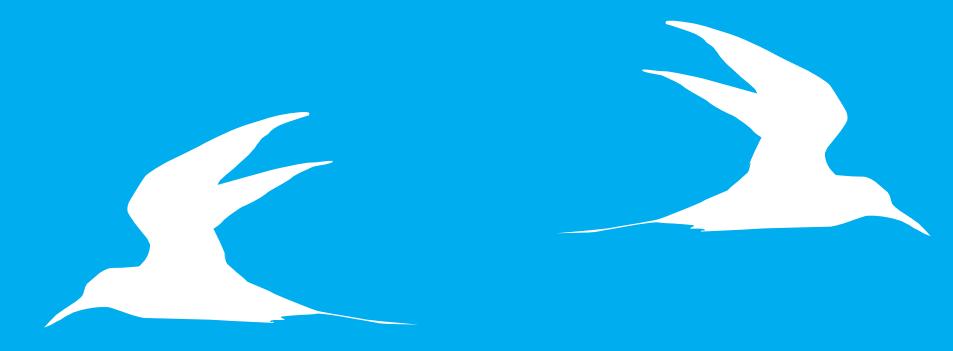
Migratory Route of the Little Tern *Sternula albifrons* in the East Atlantic Flyway

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INTRODUCTION



The Little Tern (*Sternula albifrons*) is a seabird of family Sternidae. There are three subspecies. The nominate subspecies *albifrons* can be found breeding through much of Europe, in parts of Africa and in much of western and central Asia. Based on bird ringing data, migratory individuals expand the range to include most of the coast of Africa, the Arabian Peninsula and the western coast of India (del Hoyo et al. 1996). The European population is estimated at 36,000-53,000 pairs. Unfortunately, the recent population size trend is unknown (BirdLife International 2015). The population size is considered to be decreasing in many countries (Burfield & van Bommel, 2004).

This species is protected in most European countries. It is listed in Appendix II of Convention on the Conservation of Migratory Species of Wild Animals (CMS) and is covered under the African-Eurasian Migratory Waterbird Agreement (AEWA). According to this tendency to decrease, within the EU it is listed on Annex I of the Birds Directive. In Lithuania, the Little Tern is categorized as "vulnerable" on the Red Data List.

To identify non-breeding regions and migration routes we tracked Little Terns by light-level geolocators. We provide the first full annual tracks for Lithuanian population (Northern Europe, Baltic Region) of Little Terns.

MATERIALS & METHODS

We used geolocators of model Intigeo-W65A9 manufactured by Migrate Technology to track migration in the North European population of Little Terns. Between 2014-2016 we equipped 22 breeding adult individuals with light-level geolocators.

They were fitted to tarsus of the left leg of birds with a white flag or blue plastic ring. The geolocators weighted approximately 0.9 g, including the flag or plastic ring. The geolocators represented less than 2% of the body mass of the tagged birds. We

recaptured 7 individuals of Little Tern and obtained their migration tracks.

We derived tracked bird coordinates using a software of the "Migrate Technology" (manufacturer of the geolocators used). Migration maps were made using open access GIS technologies.



Equipped geolocator on a flag



Little Terns with geolocators



Research Area and Breeding Habitat



We studied migration features of Little Terns breeding in Central Lithuania. We captured adult individuals breeding on sandy and stony near bare islands and sandbanks of Nemunas and Neris rivers, which are the longest ones in Lithuania. Our main fieldwork was performed mainly on stretch from Kaunas town (coordinates: 54.958302, 23.941764) and Jurbarkas village (55.062869, 22.749233).

Little Tern colonies of several pairs were predominating in the study area. The biggest colony consisted of 30 pairs. Little terns bred both: in conspecifics (this behavior type was predominating) and heterospecifics colonies with Common Terns (*Sterna hirundo*),

Little-Ringed Plovers (*Charadrius dubius*) and Oystercatchers (*Haematopus ostralegus*).



One of the breeding sites near Jurbarkas village

RESULTS

Bird tracking data downloaded from all recovered geolocators show the same seasonal migration routes. During pre-migration time, after the adult individuals left their breeding sites, they are usually moving on a big North European and Scandinavian region covering all Lithuania, Eastern part of Latvia, Kaliningrad Region, Baltic Sea, Denmark, Baltic Sea coastal areas of Sweden, Germany, Poland, eastern shore areas of the North Sea as well as northern part of Poland and North-Western part of Belarus. In some individuals this region covers even the Netherlands and part of Germany.

The true autumnal migration usually starts from the North Sea. The route crosses eastern part of the Great Britain, English Channel and Atlantic coast of Portugal, region of the Canary Islands, and along the African continent till the southern Liberia.

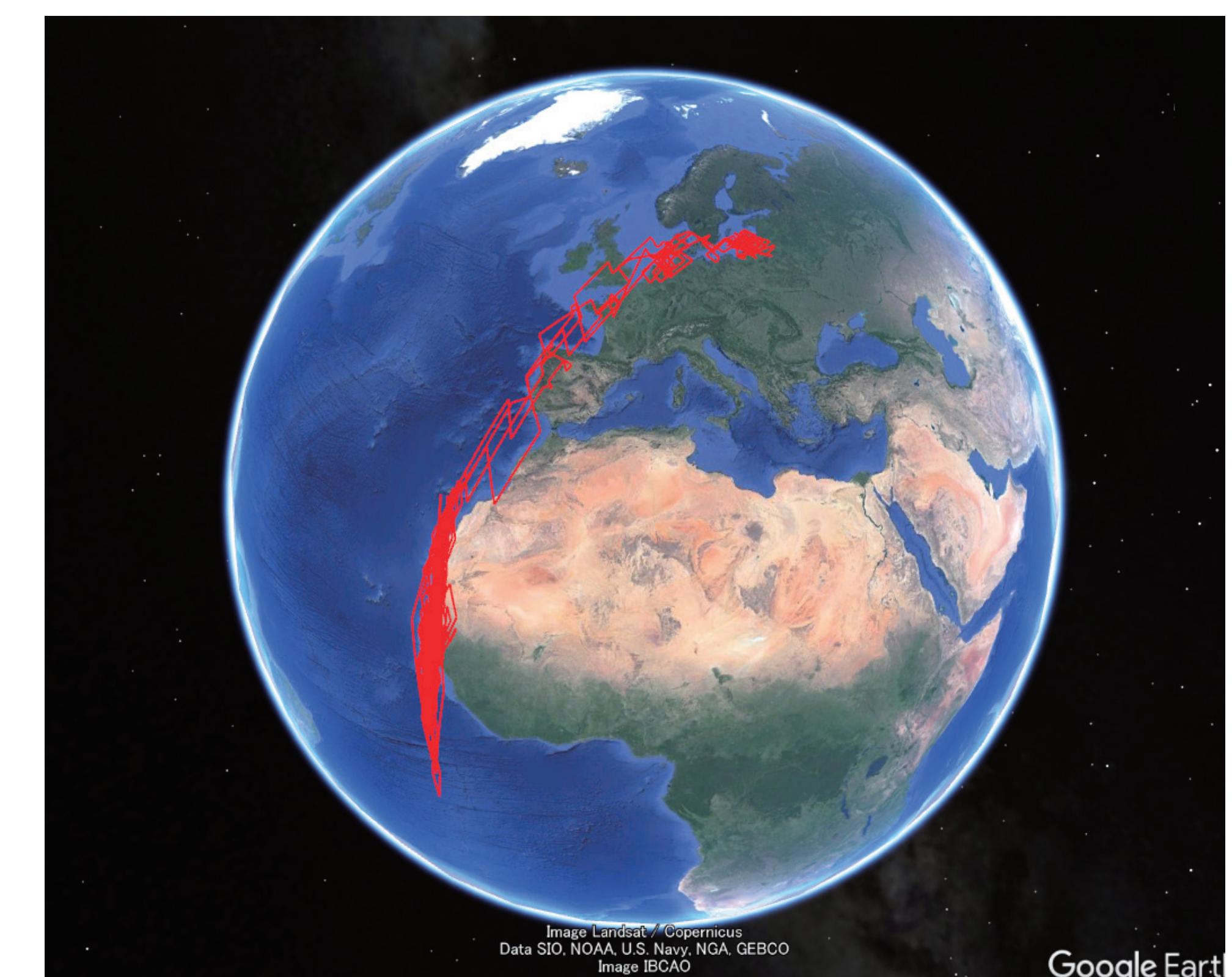
The main wintering grounds of the Little Terns (non-breeding residency sites) are Atlantic coast along such countries: Senegal, the Gambia, Guinea-Bissau, Guinea, Sierra Leone and Liberia.

The true spring migration usually starts from the Atlantic coast along Mauritania. The migration route is rather similar to the

autumnal one but birds are flying longer distances over terrestrial part of the West European countries (e.g., usually crosses some parts of Spain, France). Before the breeding period, which starts in June, July, the tracked individuals were visiting some sites in Latvia, Lithuania, Kaliningrad Region and northern part of Poland, Sweden, Belarus and passing over Baltic Sea. Some tracked individuals some selected sites visited repeatedly.



Recaptured Little Tern with a geolocator



Seasonal Migration Routes of North European (Lithuanian) populations of the Little Tern (including breeding region and non-breeding residency sites; 14 days data before and after equinoxes are excluded)

DISCUSSION

We revealed the first full annual migratory track for the European Little Terns based on geolocator data. Before it was known rather little about migration pattern and wintering sites of European population of the species.

Now we can say that the main feature of the Little Tern autumn and spring migration routes is their deviations from straight general lines. Their pre-migration movements are also very uncommon. In Northern Europe, we probably do not now any other bird species which during autumn pre-migration period concentrates in the Baltic Sea and start true autumn migration from the North Sea. Their migration route is located along the Eastern coast area of the Atlantic Ocean. The tracked Little Terns commenced the southbound migration from early August and arrived at their non-breeding residency sites from mid-August. From the mid-April they start migrating towards North and arrive

in the Baltic region from early May.

We have 3 additional information which indirectly support our findings: 1) Our banded Little Tern was observed in Kartong Bird Observatory, The Gambia on March 19, 2015; 2) In Lithuania, on June 30, 2017 we recaptured an adult with a ring of Spain. The



The Little Tern with a geolocator in Kartong Bird Observatory, The Gambia.

capture place is river mouth nearby Strait of Gibraltar; 3) Banded individual with our color ring was photographed on 5th of October 2017 in Noord-Holland, the Netherlands.

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